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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/543,612	04/05/2000	Brian T. Cunningham	DR-308J	6510

7590 03/04/2004

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EXAMINER	
CHAPMAN JR, JOHN E	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/543,612	CUNNINGHAM ET AL.	
	Examiner	Art Unit	
	John E Chapman	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *15 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *26-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 15 December 2003 has been entered.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claim 37 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claim to place the claim in proper dependent form. The processor recited in claim 28 comprises a concentration determining device.

4. Claims 31-33 and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 31 and 32, there is no antecedent basis for "said flexural plate wave sensor."

Regarding claim 33, there is no antecedent basis for "said second transducer." Furthermore, the transducer recited in claim 28 comprises a frequency detection device.

Regarding claim 42, picogram/mm^2 is not a unit of mass, but rather is mass/area (i.e., surface density).

5. Claims 26-40 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over White et al. in view of Bowers.

White et al. discloses a sensor for measuring the mass of a substance on a membrane (col. 11, line 61-68). The only difference between the claimed invention and the prior art consists in using the apparatus of White et al. to determine the concentration of a non-volatile residue. Bowers teaches providing a known volume of liquid 55 in Fig. 7 on a SAW resonator 52 in order to measure the level (i.e., concentration) of non-volatile residue in the liquid. Note col. 14, lines 30-32 and 47-49. It would have been obvious in view of Bowers to provide a known volume of a liquid on the sensor of White et al. in order to measure the level of non-volatile residue in the liquid.

Regarding claims 27 and 29-32, White et al. discloses a plate wave resonator in Fig. 11a having a membrane layer 111 whose resonant frequency is determined by the properties of the surrounding environment, including the mass of a loading fluid.
Regarding claim 22, Bowers teaches depositing a volatile solution on the resonator. Note col. 12, lines 18-28.

Regarding claim 32, White et al. teaches providing a plurality of transducers 109 (col. 15, line 9). The transducers appear to be piezoelectric and, if not, it would have been obvious to provide transducers comprising a piezoelectric layer 46 in Fig. 4.

Regarding claim 39, it is well known in the art, and would have been obvious, to provide a means to display the mass of the substance. Note col. 11, lines 27-29, of White et al.

Regarding claim 42, the apparatus of White et al. appears to inherently be capable of measuring a change of mass of a substance within the subnanogram range, and, if not, merely to increase the range of sensitivity of the device would have been obvious.

6. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over White et al. in view of Bowers as applied to claim 28 above, and further in view of Ballato.

The only further difference between the claimed invention and the prior art consists in providing an array of sensors. Ballato teaches providing an array of sensors in order to sense the presence of a plurality of chemical agents. It would have been obvious in view of Ballato to provide an apparatus comprising an array of sensors of White et al. in order to sense the presence of a plurality of chemical agents.

7. Applicant's arguments filed on 15 December 2003 have been fully considered but they are not persuasive. Applicant argues that nowhere in the disclosure of Bowers is there any teaching, suggestion, or disclosure of depositing a measured quantity of the solution on a sensor having a membrane layer in order to detect the concentration of particle in the solution. However, Bowers clearly teaches depositing a measured quantity of the solution on a sensor 52 in order to detect the concentration of particle in the solution at col. 14, lines 30-32. To the extent that the sensor 52 does not comprise "a membrane layer," Bowers has not been relied upon to provide a membrane layer, since White et al provide such teaching. One cannot show

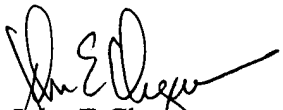
nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that cleaning solvents and isopropanol used in semiconductor integrated circuits as disclosed by Bowers are not the same as the claimed measured quantity of solution used to detect the concentration of the particles in the solution which is allowed to evaporate until the particles of solution remain on the membrane layer. However, Bowers clearly teaches measuring the non-volatile residue (NVR) of a sample liquid, which residue may be particulate. Accordingly, the recitation of particles in a solution fails to distinguish over Bowers.

Applicant argues that there is no teaching of automatically calculating the concentration of particles in solution. However, Bowers teaches NVR fluid monitoring in real time (col. 1, lines 6-10), which would have suggested automatically calculating the level of non-volatile residue in a sample liquid.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John E Chapman whose telephone number is (571) 272-2191. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John E Chapman
Primary Examiner
Art Unit 2856